Molecules to materials: supramolecular synthons and 2D metal-organic nanosheets

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For quite some time now, we have been concerned with exploitation of 'sterics' in the rational design of molecular structure to control both reactivity and molecular order/disorder. As the title portrays, I will discuss two disparate issues, namely, steric control of supramolecular synthon adoption[1,2] and formation of metal-organic 2D nanosheets.[3]

In a large set of analogous sterically-hindered compounds containing drastically different 4 functional groups, namely, acids, alcohols, amides, and boronic acids, steric control of supramolecular synthon adoption[1,2] and formation of metal-organic 2D nanosheets.[3]

Insofar as application to materials is concerned, I will exemplify the concept of 'orthogonal self-assembly' involving metal-ligand coordinate covalent bonding and hydrogen bonding to access 2D metal-organic nanosheets by disruption of interlayer hydrogen bonds in layered metal-organic materials synthesized by de novo design.

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